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A revolutionary quality indicator platform for CO_2, NH_3 and H_2S

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We present MultiSens, an innovative intelligent packaging platform that alerts the customer of packaged fresh meat quality. If the CO_2 level changes during storage it is a clear indicator that bacteria are growing inside the package and/or the package is not well sealed and the modified atmosphere has been compromised. NH_3 is a clear indicator of deterioration, as it is a product of microbial degradation and H_2S is obtained by decomposition of cysteine, it is produced during meat spoilage. Therefore, these three gases have been selected as target gases for the development of the freshness sensors. First, the correlation of meat freshness with the concentration of gases has been studied inside packages. *Pseudomonas* and total viable count (TVC) are key parameters to evaluate this. It has been accepted that 10^7 cfu/g /mL is a threshold for meat spoilage. The correlation between bacteria count and gas release has been studied in terms of time and hence the threshold of these gas concentrations for meat freshness has been established. Sensors for each of the target gases have been developed by the use of water soluble inks containing pH indicators and ionic liquids, extending the lifetime of conventional organic-based sensors. Reproducibility, cross-sensitivity, lifetime, and dynamic response have been studied obtaining good results to transfer this platform to the market. Since there is an increasing interest in the use of smartphones and similar devices such as tablets, the development of an Android/iOS application is being carried out. This implementation simplifies the whole system as no sophisticated expensive instruments shall be used, just a mobile phone, avoiding the necessity for specialized training.

Biography

Isabel M Perez de Vargas Sansalvador received her BSc in Chemistry (2005), MSc (2008) and PhD in Analytical Chemistry (2011) from University of Granada, Spain. Her Post-doctoral experience started at Cranfield University, UK and later at Dublin City University, Ireland. She is currently a Marie Curie Fellow at University of Granada. Her research interests include chemical sensors for environmental and food analysis applications.

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